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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,364	08/26/2003	Simon John Knee	ASTU-003/01US 017622-2013	4739

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EXAMINER	
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ART UNIT	PAPER NUMBER
2143	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/649,364	KNEE ET AL.	
	Examiner	Art Unit	
	J. Bret Dennison	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25 and 27-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *17-26* is/are allowed.

6)☒ Claim(s) *1-16 and 27-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

RESPONSE TO AMENDMENT

1. This Action is in response to the Amendment for Application Number 10/649,364 received on 04/04/2008.

2. Claims 1-25 and 27-30 are presented for examination.

3. The prosecution for this case has been transferred to another Examiner. All corresponding communications should be directed to Examiner's contact information, provided below.

Response to Arguments

4. Applicant's arguments and amendments filed on 04/04/2008 have been carefully considered but they are not deemed fully persuasive.

Applicant's arguments are deemed moot in view of the following new grounds of rejection as explained here below, necessitated by Applicant's substantial amendment (i.e., *by incorporating new limitations into the independent claims, which will require further search and consideration*) to the claims which significantly affected the scope thereof.

It is recommended by Examiner to amend independent claims 1, 9, and 28 to include retrieving the first flow state from a common memory, as well as writing back the modified workspaces to the common memory. For further detail, see the Allowable Subject Matter section below.

It is the Examiner's position that Applicant has not yet submitted claims drawn to limitations, which define the operation and apparatus of Applicant's disclosed invention in a manner, which distinguishes over the prior art.

Failure for Applicant to significantly narrow definition/scope of the claims and supply arguments commensurate in scope with the claims implies the Applicant intends broad interpretation be given to the claims. The Examiner has interpreted the claims with scope parallel to the Applicant in the response and reiterates the need for the Applicant to more clearly and distinctly define the claimed invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-5, 7, 9-13, 15, 27-30, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Magnussen et al. (US 6,909,713) in view of Fukumoto et al. (US 6,775,706).

6. Regarding claim 1, Magnussen disclosed a method of processing data in a stateful protocol processing system, said method comprising:

receiving a first message of a first flow comprised of a first plurality of messages (Magnussen, col. 3, lines 14-21, col. 4, lines 1-16),

deriving a first event from said first message, said first event containing flow information identifying said first flow (Magnussen, col. 4, lines 1-16);

extracting said flow information from said first event (Magnussen, col. 4, lines 50-60);

Magnussen also disclosed selecting a protocol processor using this flow information (Fig. 7, for example 702 and 708).

However, Magnussen did not explicitly state:

retrieving, using said flow information, a first flow state characterizing said first flow, said first flow state including a first workspace portion and a second workspace portion;

assigning said first workspace portion to a first protocol processing core and said second workspace portion to a second protocol processing core; and

processing, consistent with a stateful protocol associated with said first flow, said first event using said first protocol processing core and said second protocol processing core.

In an analogous art, Fukumoto disclosed a multi-protocol switching system having multiple processors, each of which being assigned a specific protocol for processing, including stateful protocols (col. 4, lines 35-40), in which a processor selection section (Fig. 3, 304) determines which protocol processor (Fig. 3, 305, 306...307) the packet is directed to for protocol processing (col. 4, lines 29-35). Fukumoto further disclosed conducting the distribution of processing to each protocol by self-routing (col. 3, lines 5-12) in which, when data processed by a protocol processor needs to be further processed by a protocol processor, the packet is output to that protocol processor (col. 7, lines 20-30, and also lines 36-39).

Like the teachings of Magnussen, Fukumoto also disclosed a multiprotocol switching system for protocol processing. As such, one would have been motivated to combine their teachings because they are all within the same environment.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate separate processors for each protocol in order to be able to quickly and easily configure each protocol processor to implement a particular communication protocol for the benefit of implementing a system that is scalable across new and continuously developed/modified protocols, thereby increasing desirability for network administrators to use such a system.

Claim 9 includes a system with limitations that are substantially similar to claim 1. Magnussen disclosed a system as shown in Fig. 2. Claim 28 includes a method with limitations that are substantially similar to claim 1. As such, claims 9 and 28 are rejected under the same rationale.

7. Regarding claims 2, 10, Magnussen and Fukumoto disclosed the limitations as described in claims 1, 9, including wherein said first flow state is defined at least in part by a plurality of protocol layers, said first workspace potion and said second workspace portion corresponding to different ones of said plurality of protocol layers (Fukumoto, col. 5, lines 30-35).

8. Regarding claim 3, Magnussen and Fukumoto disclosed the limitations as described in claims 1, including wherein said processing includes modifying said first

and second workspace portions in order to thereby yield a modified first workspace portion, and writing back said modified first and second workspace portions (Fukumoto, col. 7, lines 23-39).

9. Regarding claims 4, 12, Magnussen and Fukumoto disclosed the limitations as described in claims 3, 11, including wherein said processing further includes communicating an inter core event from said first protocol processing core to said second protocol processing core (Fukumoto, col. 7, lines 23-39; Fukumoto disclosed one processor able to pass the data packet to another processor).

10. Regarding claims 5, 11, Magnussen and Fukumoto disclosed the limitations as described in claims 4, 9, including wherein said second protocol processing core modifies said second workspace portion in order to create a modified second workspace portion and writes back said second modified workspace portion (Fukumoto, col. 7, lines 23-39).

11. Regarding claim 7, 15, Magnussen and Fukumoto disclosed the limitations as described in claims 1, 9, including wherein said first flow state further includes a shared flow state provided to both said first protocol processing core and said second protocol processing core (col. 5, lines 20-25, main memory used in conducting the management of the entire multi-protocol processing device).

12. Regarding claim 13, Magnussen and Fukumoto disclosed the limitations as described in claims 11, including wherein said second protocol processing core modifies said second workspace portion in order to create a modified second workspace portion and writes back said second modified workspace portion to said lookup controller (Fukumoto, col. 7, lines 23-39).

13. Regarding claim 27, Magnussen and Fukumoto disclosed the limitations as described in claims 1, including wherein said first event includes state information relevant to said stateful protocol (col. 1, lines 42-48).

14. Regarding claim 29, Magnussen and Fukumoto disclosed the limitations as described in claims 28 including wherein the deriving includes determining the first event to be of a first type and including an indication of said first type in a representation of the first event (Magnussen, Fig. 7, 702 and 708 and related portions, type belonging to a specific processor).

15. Regarding claim 30, Magnussen and Fukumoto disclosed the limitations as described in claims 29 including wherein said processing of said first event is performed in accordance with said first type (Magnussen, Fig. 7, 702 and 708 and related portions, transmitting to the specific processor).

16. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Magnussen and Fukumoto as applied to claims 1 and 9 above, and further in view of Bunce et al. (US 20030163589).

17. Regarding claims 6 and 14, Magnussen and Fukumoto disclosed the limitations as described in claims 1 and 9, but did not explicitly state wherein said first protocol processing core issues a done signal upon completing processing of said first event, said done signal causing release of an event queue element associated with said first protocol processing core.

In an analogous art, Bunce disclosed a system for pipelined packet processing in which the processors are set up in a specialized pipelined fashion (see Fig. 2C), in which the processors availability are determined by their input work queue (Bunce, [0007]) and when a processor completes its assigned task, it issues a synchronization signal to an available processor and places the job pointer into the processor's input work queue of another processor, thereby passing the job to the next processor.

One would have been motivated to incorporate the teachings of Bunce into the teachings of Magnussen and Fukumoto, since all three provide teachings related to protocol processing of packets with multiple processors, and are therefore within the same environment.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate providing a synchronization signal by each processor when they have completed their task into the combined teachings of

Magnussen and Fukumoto in order to more efficiently complete tasks through un-overloaded processors to improve overall network transmission efficiency (Bunce, [0006]).

18. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Magnussen and Fukumoto as applied to claims 1 and 9 above, and further in view of Browning et al. (US 6842809).

19. Regarding claims 8 and 16, Magnussen and Fukumoto disclosed the limitations as described in claims 7 and 15, but did not explicitly state wherein said first protocol processing core generates a flow state write mask upon modifying selected areas of said shared flow state portion, said flow state write mask preventing said selected areas from being overwritten.

In an analogous art, Browning disclosed a multiprocessor system in which a processor owns a lock to serialize access to a shared memory resource, the lock giving exclusive access to the resource until the lock is released (Browning, col. 1, line 65 through col. 2, line 5).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the locking mechanisms of Browning into the combined teachings of Magnussen and Fukumoto in order for sharing of memory to be fair among all of the processors of the multiprocessor system, thereby enabling

processors to acquire locks even when coexistent with processors with shorter latencies (Browning, col. 2, lines 35-55).

Allowable Subject Matter

20. Claims 17-25 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art disclosed multiple types of multi-processor protocol processing systems.

For example, Reents et al. (US 7328270) disclosed protocol processing in which multiple processor cores are aligned in series (see Figs. 4 and 8), in which processing is passed from processor to processor each time the current processor has completed its task.

Magnussen et al. (US 6,909,713) shows processors in parallel each assigned a flow for protocol processing (see Fig. 2 and related portions of the spec).

Seno et al. (US 5,590,328) disclosed protocol parallel processing apparatus having multiple CPUs, a shared memory accessed by each CPU for storing a CPU state table, the shared memory also storing the PDU's for processing (Seno, col. 2, lines 50-55, col. 3, lines 30-35) in which the apparatus assigns an available CPU for new connections or selects the CPU that is currently processing the existing connection for the PDU (col. 3, lines 35-40, 44-50).

Bunce et al. (US 2003/0163589) disclosed pipelined packet processing in which processors and their corresponding queues are set up in a specialized pipelined

fashion, wherein when a processor completes its task, it can determine which processor should be the next processor in the pipeline based on the availability of their queue (see Fig. 2C, processor 250 determines which queue to send to, either 252 or 260). When the packet is completed through the pipeline, it gets shipped out on the Outbound DMA.

However, the prior art did not disclose extracting flow information from an event, retrieving from a common memory using said flow information, a flow state which includes two workspaces, and storing each workspace in separate distinct local memories, processing said first event consistent with a stateful protocol and modifying the workspaces and writing back the workspaces to the common memory, in combination with the rest of the claim limitations.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Examiner's Note: Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part

of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Bret Dennison whose telephone number is (571) 272-3910. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/J. B. D./
Examiner, Art Unit 2143

/Nathan J. Flynn/

Supervisory Patent Examiner, Art Unit 2143